DOCUMENT RESUME

ED 040 623 FL 001 787

AUTHOR Smith, W. Flint; Littlefield, Lael
TITLE The Electronic Classroom, the Broadcast and the Record-Playback Language Laboratory: Their Contribution to Achievement in Beginning Language Learning.
SPONS AGENCY Indiana Univ., Bloomington. Indiana Language Program.
PUB DATE Jan 69
NOTE 65p.

EDRS PRICE EDRS Price MF-$0.50 HC-$3.35
DESCRIPTORS Academic Achievement, Audio Active Compare Laboratories, Audio Active Laboratories, Audiolingual Methods, Educational Equipment, *Educational Experiments, *Electronic Classrooms, Equipment Evaluation, French, German, *Language Instruction, Language Laboratories, *Language Laboratory Equipment, *Modern Languages, Secondary Schools, Spanish, Student Attitudes, Teacher Attitudes

ABSTRACT

Research described in this report compares the relative achievement of three groups of secondary school students beginning language instruction in German, French, and Spanish using the electronic classroom, the record-playback laboratory, and the broadcast language laboratory with that of a control group. The second major area of research concentrates on the role which interests and attitudes play in second-language learning. Teacher and student attitudes toward the media utilized are revealed through analysis of statistical results of attitudinal tests. Procedures employed in the experiment and results of the analysis of data bearing on the effectiveness of the equipment groups are detailed. Many tables, lists of figures, and a bibliography are included. For a related document see ED 037 103. (Author/RL)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

ED040623

The Electronic Classroom, the Broadcast and the Record-Playback Language Laboratory: Their Contribution to Achievement in Beginning Language Learning

By

Wm. Flint Smith
Purdue University
Lafayette, Indiana

with the help of
Mrs. Lael Littlefield
Marion High School
Marion Community Schools
Marion, Indiana

A Report to the

Indiana Language Program

for Research During

the 1967-68 Academic Year

FL001787

The Research Reported Herein Was Supported by a Grant from the Indiana Language Program

January, 1969

TABLE OF CONTENTS

Page

LIST OF TABLES.....iv

LIST OF FIGURES.....v

INTRODUCTION.....1

Definition of Terms.....4
Primary Objectives.....6
Secondary Objectives.....7

Teacher Expectancy and Skill.....8

Review of the Literature.....9

Interest-Motivation and Attitude.....9

PROCEDURES.....10

The Sample.....10
The Pretests.....16
The Criterion Measures.....17
Student Attitudes.....19
Computational Procedures.....22

Primary Objectives.....22
Secondary Objectives.....25

TEACHER ATTITUDE ANALYSIS.....28

The Instructors.....28
Teacher Expectancy.....30

Experimental and Reference Group Attitudes.....32
Stability of Teacher Attitudes Over Time.....32

Distribution of Practice.....36
The Learning Materials.....37
Measurement and Evaluation of Achievement.....39

RESULTS OF THE ANALYSIS OF THE DATA.....39

Aptitude and Intelligence by Equipment Group Analyses.....39
Effectiveness of the Equipment Groups.....40
French.....40
German.....40
Spanish.....42

DISCUSSION.... 48

CONCLUSIONS AND RECOMMENDATIONS... 50

BIBLIOGRAPHY.....54

APPENDIX A..... 57

APPENDIX B..... 59

LIST OF TABLES

Page

1. Description of the Sample.....12

2. The Initial Sample, Categories of Attrition and Distribution.....13
of the Final Sample: French

3. The Initial Sample, Categories of Attrition and Distribution.....14
of the Final Sample: German

4. The Initial Sample, Categories of Attrition and Distribution.....15
of the Final Sample: Spanish

5. Characteristics of the Sample with Respect to the Pretest Measures.....18

6. The Unit and Composite Tests: Their Reliabilities as Obtained From.....20
the Present Sample

7. The Posttests and Their Reliabilities: All Languages.....21

8. Significant Factor Loadings Ordered by Magnitude for the Concept.....23
Language Practice Tapes

9.

9. Description and Characteristics of the Teachers Involved in the Study....29

10. Significant Factor Loadings Ordered by Magnitude for Concepts
Rated by the Teacher Reference Group: Language Laboratory and... 30
Electronic Classroom

11. Significant Factor Loadings Ordered by Magnitude for Concept
Language Practice Tapes Rated by the Teacher Reference Group.....34

12. Mean Attitude Scores for the Concepts Language Laboratory, Electronic
Classroom and Language Practice Tapes Compared Between the Teacher.....34
Reference Group and Marion Teachers

13. Application of the Electronic Classroom and the Language Laboratory:
Minutes use per Six Weeks.....38

14. Results of the Covariance Analysis of the Equipment Group Effective-
ness: French.....41

15. Results of the Covariance Analysis of the Equipment Groups Effective-
ness: German by Instructor..... 43

16. Results of the Covariance Analysis of the Equipment Group Effective-
ness: Spanish.....44

17. Summary of Significant Individual Comparisons Among Equipment Gruups.....45

18. Results of the Analyses of Variance on the Scores for Change-in Interest
I, Change in Interest II, and Change in Attitude.....47

LIST OF FIGURES

Page

1. Profile Rating for Students on Concept Language Practice tapes.....24

2. Schema for Aptitude by Equipment-Group Factorial Analysis showing Cell Frequencies.....26

3. Schema for Intelligence by Equipment-Group Factorial Analysis Showing Cell Frequencies.....26

4. Schema for Single-Factor Analyses of Covariance Showing Cell Frequencies.....27

5. Schema for Single-Factor Analysis of Variance Showing Cell Frequencies.....27

6. Profile Ratings for Teacher Reference Group on Concepts Electronic Classroom, Language Laboratory and Language Practice Tapes.....31

7. Pre- and Post-profiles for Marion Teachers Rating Concepts Electronic Classroom and Language Laboratory.....35

INTRODUCTION

The controversy surrounding the use of electro-mechanical devices in beginning language instruction continues. The wide variety of installations in schools and colleges and the diverse manners in which teachers use them has defied unanimity of opinion as to the relative effectiveness of media in language learning. One need only consult the literature to find arguments in favor or against the language-laboratory concept. Similarily, broadfield surveys and "laboratory" comparisons have yielded conflicting results. Both the Keating Report (1963) for French, and the more recent USOE-sponsored Pennsylvania Study by Smith (1968) for French and German have reported that the language laboratory proved ineffective in contributing to achievement in listening, reading, and in speaking ability in the typical secondary-school situation. The results of these broadfield surveys are disconcerting, to say the least, for tens of millions of dollars (see Tanzman, 1967) have been spent on equipment in an attempt to facilitate the beginning student's task of learning a second language.

The lack of significiant evidence favoring the use of the laboratory is not limited to secondary education. Most recently, the results of a post facto survey by Mueller and Wiersma (1967) of the language laboratory in institutions of higher learning caused the authors to question the routine use of complex and expensive equipment in language learning after reviewing the impact of four types of laboratories on achievement in beginning language in ten small colleges. While no significant differences were noted between the respective treatment groups compared, mean speaking-test scores were somewhat higher for those who used record-playback equipment than for any

other equipment group (audio-active or audio-passive), although it is noteworthy that no control group was included in their analysis. No further trends were apparent with the exception that the use of a single tape-recorder and audio-passive headsets contributed least to achievement of any kind.

One exception to ths paucity of positive results in large-scale "language-laboratory research" is the well-planned experiment by Lorge (1964), undertaken in ten New York City schools. Two successive experiments were designed. The first compared lab versus no-lab at three levels of instruction-first-, second-, and third-year. Results indicated that differences in achievement developed at the different levels. The laboratory group showed superiority in speaking and listening with no loss in the writing skills. Spaced practice or at least two thirty-minute periods per week was shown to be the minimum contact which would allow the students to derive significant benefit from supervised practice with language tapes. A follow-up experiment by the same investigator ascertained the relative effectiveness of two types of equipment--audio-active and record-playback--each in two modes of presentation: once per week and thirty minutes daily. Significant differences favored the groups experiencing <u>daily</u> practice via the record-playback installations. Greater achievement in the listening and speaking skills was obtained by the group which recorded and played back their responses each day. The group with daily audio-active practice gained almost as much as the record-playback group. In overall gains, the daily lab groups were superior to the no-equipment groups.

While discussion and experimentation continues with regard to the pros and cons of the language laboratory (Hocking, 1964; Hutchinson, 1964 and

1966; Johnson, 1966) and while the misuse of the laboratory in the schools and colleges is generally deplored (Scherer, 1965; Edgerton, 1968), alternative installations and electromechanical devices continue to be developed almost daily to provide the beginning student and his teacher with a means to speed and to facilitate the learning of a foreign languages. Among these alternatives one finds the school public-address system (White, 1963), radio broadcast (Cole, 1963; Cook, 1965), the telephone (Smith, 1967), and a host of self-contained wireless systems with portable consoles, headsets, and tape playbacks designed to be moved from room-to-room, even from school-to-school as the need arises.[1]

The electronic classroom is yet another means of presenting students with machine-guided practice. The term itself is not new. One finds references to the "electronic classroom" from time to time in the literature (Mallery, 1961; Crossman, 1964; Barrutia, 1967; Regenstreif, 1968) but only one investigation has surveyed, empirically, its relative merits. Smith and Littlefield (1967) in a pilot study to this research investigated the use of the "chandelier-type" electronic classroom and its impact upon achievement in first-year French, German, and Spanish at the secondary-school level. Twenty-seven of thirty-one observed differences in criterion measures-interim and end-of-term examinations--were in the direction of the groups using the electronic classroom (five significantly so) when achievement in listening, speaking, and reading was compared to that of similar groups

---

[1]See for example the descriptive literature by Electronic Future Incorporated, 57 Dodge Ave., North Haven, Connecticut; P and H Electronics, 426 Columbia Street, Lafayette, Indiana; Dictation Disc Company, 240 Madison Ave., N.Y.

using the record-playback language laboratory. The authors recommended a verification of the directional trend favoring the "In-class" as opposed to the "satellite" facilities for language practice purposes, and further study into the value of recording and playing back as a learning activity. The Research herein reported is intended to fulfill recommendations by comparing the relative achievement of three equipment groups (the electronic classroom, the record-playback language laboratory, the broadcast language laboratory) with that of a control group.

Definition of Terms

The following definitions, which also serve to characterize the essential differences among the treatment groups, are established for this research:

The record-playback language laboratory is an integrated group of electronic components designed to provide for and improve communication in a learning space. It contains for each student (1) a booth for acoustical and visual isolation, (2) a tape recorder, with appropriate related electronic and remote controls, on which individual utterances can be recorded, for later playback and comparison with a model, (3) an audio-activated microphone-headset enabling the student to hear himself as others hear him. For the teacher there is a console with switches to (1) enable him to distribute one or more tape-recorded lessons at will and, (2) to hear and to speak to any student in the room via a monitor-intercommunication network without disturbing any other

The broadcast language laboratory is similar in all respects to the recor

playback laboratory except that the booths or carrels, while equipped to receive multiple lessons from the console, have no provisions for the students to record, individually and simultaneously, their responses to auditory stimuli,

The components of both the record-playback and the broadcast laboratory are installed in a learning space apart from the regular language classrooms. Students customarily visit these laboratories as a group with their teacher during a portion of the regular class period and in accordance with a pre-determined schedule.

The electronic classroom is defined as an integrated group of electronic components installed within the foreign language classroom. Machine-guided practice is thus available during any class period without having to move students en masse to a special room. There are no booths nor individual tape recorders. Each student is equipped with an audio-activated microphone-headset. For the teacher there is a console with multiple program sources and moniotr-intercommunication facilities similar to those contained in conventional language laboratories. Of practical importance, all of the equipment for the student is retractable, via "chandelier-type" arrangements, into the ceiling. The electronic classroom, thus, is immediately convertible for other subject-matter instruction; more importantly, the equipment is immediately accessible and, thus, allows the teacher to provide distributed machine-guided practice at those times judged to be the most useful to the beginning language student.

The term control is the title given to language classes which receive beginning language instruction without systematic use of electro-mechanical devices of the types defined above.

Primary Objectives

The purpose of this study is to evaluate the following research hypotheses with respect to beginning language instruction in French, German, and Spanish: Given equipment groups as follows: (a) electronic classrooms (herein designated EC) where structural drills and related recorded materials can be distributed for practice throughout the week or instructional hour as the teacher desires, (b) conventional language laboratories--both broadcast (designated LL-1) and record-playback (designated LL-2) located apart from the regular classrooms where students practice on assigned days of the week according to a predetermined schedule and, (c) a control group where students have no recourse to electro-mechanical devices or tape-recorded exercises in beginning language learning:

(1) Students in system (a) will achieve more in listening, reading, and speaking than students in system (b) or (c) as a result of more optimally spaced practice with recorded materials.

(2) The absence of record-playback facilities in (a) will be counterbalanced by a greater access to materials for language-practice purposes.

The above research hypotheses were tested as statistical hypotheses stated in the null form:

(1) There will be no difference in listening comprehension, respectively, in French, German, or Spanish between students in systems (a), (b), or (c).

(2) There will be no difference in reading ability, respectively, in French, German, or Spanish between students who are studying

in systems (a), (b), and (c).

(3) There will be no difference in speaking ability, respectively, in French, German, or Spanish between students in systems (a), (b), and (c).

(4) There will be no interaction between the effectiveness of the equipment groups in systems (a), (b), or (c) or any of the above variables and whether the student is in the upper- or lower-half of his group with respect to language attitude or intelligence.

Secondary Objectives of the Study

In addition to the above hypotheses related to the cognitive growth of the student, more information was sought concerning the role which interests and attitudes play in second-language learning. Initial homogeneity of interest would lend credence to the representativeness of the sample. Any changes in interest or attitude might be revealed by evaluating scores from an appropriate scale given to the respective groups at the beginning and again at the end of the school year. Thus, the following hypotheses were also submitted to validation:

(1) First-year language students have positive attitudes and interests for language learning and associated media at the beginning of the school year.

(2) There will be no interaction between the effectiveness of the equipment groups in systems (a), (b), or (c) and whether the student is in the upper- or

lower-half of his group with respect to interest-motivation for studying a second language or with respect to his evaluation of the corresponding taped, practice exercise materials.

(3) There will be no difference between groups in systems (a), (b) or (c) in maintaining the student's interest-motivation for language study or his attitude toward language practice tapes.

Teacher Expectancy and Skill

Beyond the student's interest-motivation or attitude orientation, two additional factors may contribute to the successful use of electro-mechanical devices in language learning: (1) the teacher's attitude toward the concept of tape-use and media in language learning, and (2) the teacher's skill in the application of the materials and the facilities. Since the amount of time the student is able to spend with recorded materials is of paramount importance (Carroll, 1966, and Birkmaier and Lang, 1967), the teacher's patterns of using the electronic classroom and the language laboratory can be considered partial evidence of successful use of the equipment for each teacher were tabulated and compared as an aid to interpretation of results. In addition, answers are sought for the following questions: What are representative attitudes towards media (equipment and materials) for language learning? Is any bias toward either the language laboratory or the electronic classroom reflected in their use? What changes in attitude will accrue as the teachers use the

respective media over the school year? Stated as postulates:

(1) There will be no difference in teacher attitudes toward the electronic classroom and the language laboratory at the beginning of the academic year.

(2) Teacher attitudes toward the respective equipment groups and toward language practice tapes will remain stable through the academic year.

The results of this study are thought to be internally valid for the group of Marion High School students and their teachers, and for the participanting group of ninth-grade students from Jones and McColloch junior high schools of Marion, Indiana. Similarly, the results are thought to be externally valid so that they might apply in a limited sense to similar populations of secondary-school students.

Review of the Literature

For a detailed review of the literature the reader is referred to a summary of previous reviews by Smith and Littlefield (1967) which accompanied the pilot report to this investigation. Additional reviews by Carroll, (1963 and 1966), Mathieu (1962), Sawyer (1964) and Birkmaier and Lange (1967) also provide comprehensive summaries of research on language laboratory media and materials. A brief review of studies pertinent to the secondary objectives of this study is given below.

Interest-Motivation and Attitude

Rivers (1964) distinguished three stages of interest-motivation in foreign language study: "Launching-out, getting to grips with the language, and consolidating lasting language habits..." (p. 82). The student may have a

high degree of interest in learning a second language during the first stage cited by Rivers where short-term goals, e.g., learning the basic formulas of salutation and address, and the novelty of a new and different form of communication, appear instrumental in maintaining a positive set to acquire a second language. Associated attitudes at the second stage and at the third stage should be a function of achievement; thus, interest wanes for some students as short-term goals are reached, while others are able to maintain a long-term perspective and, correspondingly, a postive orientation towards learning a second language.

Within the respective stages of interest-motivation, there is some evidence that the use of electro-mechanical devices is instrumental in keeping students working at a high rate (Bauer, 1964; Lorge, 1964). Alternatively, student attitudes toward activities in the language laboratory appear to affect their motivation and concentration to task (Neidt and Hedlund, 1965; Smith and Littlefield, 1967). Students surveyed by both sets of authors indicated a preference toward activities governed by short periods of concentrated practice where the principal exercise was related to dialog repetition or to listening and responding.

PROCEDURES

The Sample

The first-year language students in this investigation were representative of language students in comprehensive American high schools and junior-high schools with enrollments of 3000 and 1000, respectively. Most students began their foreign language study in the ninth grade, e.g., junior high school; however, some delayed election of a second language until the tenth or the eleventh grade. The majority of students were enrolled for the purpose of fulfilling entrance requirements at colleges and universities, although pupils

in non-college preparatory courses were often matriculated in the same course.

For the purpose of this study, every student of French, German, and Spanish enrolled in the first-year course made up the potential observations of the investigation. The students were assigned to one of four first-year sections of French or German (three in Spanish) by computer in the senior high school. Only one section of language was offered in each of the participating junior-high schools, a period reserved at the beginning of the school day. Computer registration procedures, in the senior high school at least, while not completely random due to "blocking" or preferred schedules for some students, assured a practical representativeness in the distribution of the students within the respective equipment groups. A similar representativeness can be seen among the ninth-grade students upon inspection of the characteristics of the total sample listed in Table 1.

Thus, 301 students--French 120; German 102; Spanish 79--enrolled in the beginning language course in September of 1967. By June, the original sample had been reduced to an overall total of 216 students. Another twelve with previous language experience were dropped from the analysis, thus, the final sample consisted of 76 French, 81 German and 47 Spanish students. Tables 2-4 summarize the initial and final sample by categories of attrition. All but one of the categories listed were entirely unrelated to the experimental variables. Differences between the percentages of students not completing the first semester due to poor study habits and/or lack of application (Category 2) were evaluated for significance. In no cases were loses significant at the .05 level of confidence. The remaining categories (3-5) were not evaluated for significance since the attrition reported was independent of the treatment conditions. Nor was there an attempt made to analyze the data for students who switched treatment

Table 1

Description of the Sample

Characteristics	EC (N=26)	LL-1 (N=18)	LL-2 (N=20)	Control (N=12)	EC[1] (N=35)	LL-1 (N=19)	LL-2 (N=10)	Control (N=17)	EC (N=18)	LL-2 (N=10)	Control (N=19)
Sex:											
Male	11	6	6	4	20	10	3	14	10	3	5
Female	15	12	14	8	15	9	7	3	8	7	14
Age:											
13-14 years	10	8	6	12	9	3	2	17	4	2	18
15-16 years	16	10	13	0	26	17	8	0	13	7	1
17-13 years	0	0	1	0	0	0	1	0	1	0	0
Grade in School:											
9th	10	8	6	12	9	3	2	17	4	2	19
10th	14	7	13	0	24	13	6	0	10	8	0
11th	2	3	0	0	2	3	2	0	2	0	0
12th	0	0	1	0	0	0	0	0	2	0	0
Previous Languages:											
English (native)	26	18	20	12	35	19	10	17	18	10	19
Latin	1	0	4	1	0	3	1	0	1	1	0
French	0	0	0	0	2	1	0	0	1	0	0
German	1	0	1	0	0	0	0	0	0	2	0
Spanish	2	5	0	1	3	1	0	0	0	0	0
Russian	0	0	0	0	0	1	0	2	0	0	0
More than one language	0	0	0	0	0	0	1	0	0	0	0
No foreign language	24	13	15	10	30	13	8	15	14	9	19

Table 2

The Initial Sample, Categories of Attrition and Distribution of the Final Sample: French

Categories	EC Number	EC Percent	LL-1 Number	LL-1 Percent	LL-2 Number	LL-2 Percent	Control Number	Control Percent
1. Initial Sample	53[1]	100%	27	100%	25	100%	15	100%
2. Students not completing Semester I due to failure	0	0%	0	0%	1	4%	0	0%
3. Students who withdrew or moved from city	2	4%	2	7%	0	0%	3	20%
4. Students with scheduling difficulties Semester II	0	0%	2	7%	4	16%	0	0%
5. Students with previous language experience	0	0%	5	19%	0	0%	0	0%
6. Students who changed equipment groups at mid-year	25[2]	46%	0	0%	0	0%	0	0%
7. Final Sample	26	50%	18	67%	20	80%	12	80%

[1]Includes two classes.

[2]Dropped from final analysis

Table 3

The Initial Sample, Categories of Attrition and Distribution of the Final Sample: German

Categories	EC Number	EC Percent	LL-1 Number	LL-1 Percent	LL-2 Number	LL-2 Percent	Control Number	Control Percent
1. Initial Sample	45[1]	100%	34	100%	16	100%	17	100%
2. Students not completing Semester I due to failure	1	2%	0	0%	0	0%	0	0%
3. Students who withdrew or moved from the city	1	2%	0	0%	0	0%	0	0%
4. Students with scheduling difficulties Semester II	8	18%	5	21%	6	34%	0	0%
5. Students with previous language experience	0	0%	0	0%	0	0%	0	0%
6. Students who changed equipment groups at mid-year	0	0%	0	0%	0	0%	0	0%
7. Final Sample	35	78%	19	79%	10	66%	17	100%

[1]Includes two classes

Table 4

The Initial Sample, Categories of Attrition and Distribution of the Final Sample: Spanish

Categories	EC Number	EC Percent	LL-2 Number	LL-2 Percent	Control Number	Control Pereent
1. Initial Sample	42[1]	100%	16	100%	21	100%
2. Students not completing Semester I due to failure	2	5%	1	8%	0	0%
3. Students who withdrew or moved from the city	1	2%	0	0%	0	0%
4. Students with scheduling difficulties Semester II	4	10%	2	15%	0	0%
5. Students with previous language experience	2	5%	3	19%	2	10%
6. Students who changed equipment groups at mid-year	15[2]	37%	0	0%	0	0%
7. Final Sample	18	41%	10	58%	199	90%

[1]Includes two classes.

[2]Dropped from the final analysis.

conditions at mid-year (Category 6) since there was no way to evaluate potential order effects. Hence, these students were dropped from the final analysis.

The Pretests

Five pretest measures were obtained from all students enrolled in the first-year courses of the three languages included in the investigation. These measures allowed an estimation of the student's relative language aptitude, level of intelligence, interest-motivation (two pre-tests) and attitude toward language practice tapes.

The Modern Language Aptitude Test (MLAT), long form, by Carroll and Sapon (1959) has enjoyed wide use as an internal control variable in research studies dealing with second-language learning. Odd-even reliabilities of .90, .92, and .94 for grades nine, ten and eleven are given in the 1959 Manual for the long form. Criterion-related validities for the MLAT with the final sample ranged between .16 and .65 for the achievement tests and between .29 and .71 with grades. Median validites were..54 and .58, respectively, and as such were similar to validites reported by Carroll and Sapon (1959, p. 12).

Initial interest-motivation was assessed by a combination of items adapted from Lambert (1961) and Pimsleur (1962) and from an expanded version of the Lambert scale by Gamba and Smith (1966).[2] Odd-even reliabilities from the initia sample of 301 students were .88 and .75, respectively. Corresponding validities ranged between -.03 and .26 for Interest Test I and between -.04 and .21 for Interest Test II; median validities for the respective instruments were..08 and .03.

An index of the student's attitude toward media was obtained at the beginning of the school year under the format of the semantic differential.[3]

---

[2] Appendix A
[3] Appendix B

Factor analytic procedures used to derive an attitude score for each student and described below.

Finally, an indication of level of general intelligence as measured by the Henmon-Nelson Test of Mental Anality was obtained from the individual's folder of scholastic aptitude and achievement. Odd-even reliabilities reported in the Manual (1957) for grades 6-9 are .91, .93 for Forms A and B, respectively. Criterion-related validities for the present study ranged between .11 and 56 with interim and end-of-term examinations and between .29 and .56 with grades; median validities were .51 and .47.

The characteristics of the sample with respect to the pretest measures are listed in Table 5. Single classification analyses of variance and subsequent individual comparisons among groups within the respective languages yielded but one significant difference: the Henmon-Nelson Test for the control group in German. In general, the remaining differences, while non-significant, tended to favor the electronic classroom over the language laboratory groups. Nevertheless, the pretest data do give further evidence that the respective treatment groups represented random samples from the same population.

The Criterion Measures

Two types of criterion measures in each language were used to assess the relative achievement of the students: interim or six-week examinations (taken from the A-LM Teacher's Manual (1961) for French and German and from the Encyclopedia Britannica Manual (1963) for Spanish), and standardized, end-of-term examinations. Both types of tests seemed to contain considerable content validity.

The unit examinations in each language had no corresponding published reliability information, hence, coefficients of internal consistency were computed, based upon the subject of the present study. Five and seven unit

Table 5

Characteristics of the Sample with Respect to the Pretest Measures

Language and Equipment Group	N	Modern Language Aptitude Test $\bar{X}$	Modern Language Aptitude Test s	Henmon-Nelson Test of Mental Ability $\bar{X}$	Henmon-Nelson Test of Mental Ability s	Interest Test I $\bar{X}$	Interest Test I s	Interest Test II $\bar{X}$	Interest Test II s	Semantic Differential $\bar{X}$	Semantic Differential s
French											
EC	26	85.32	16.98	63.40	9.32	131.24	16.66	58.88	10.04	69.88	14.18
LL-1	18	83.06	27.09	59.67	11.14	136.28	16.55	56.11	8.01	61.67	16.88
LL-2	20	87.10	23.58	63.00	11.10	132.70	14.52	57.85	7.64	62.70	9.97
Control	12	80.33	21.79	62.00	10.84	139.33	17.22	61.17	9.02	66.00	14.79
Combined French	76	84.29	20.57	62.48	10.17	134.16	16.30	57.78	8.45	64.80	13.14
German											
EC[1]	35	97.26	21.65	66.06	8.75	133.94	11.75	59.29	7.93	62.89	13.62
LL-1	19	97.37	18.04	65.55	10.14	141.74	11.61	60.05	6.43	66.11	10.54
LL-2	10	110.70	28.95	67.80	8.46	140.20	11.92	60.05	5.66	68.40	14.52
Control	17	88.82	20.67	73.00*(4.20)	9.80	136.71	10.69	55.59	8.04	57.47	15.48
Combined German	81	97.17	22.13	67.32	9.62	137.12	11.77	58.78	7.44	63.20	13.71
Spanish											
EC	18	86.89	18.98	66.61	8.17	129.27	11.05	55.40	7.10	72.13	11.51
LL-2	10	87.50	23.65	62.40	8.20	125.80	14.13	52.60	6.42	65.80	7.55
Control	19	72.32	28.57	58.39	14.99	128.79	20.09	59.47	8.88	63.52	13.57
Combined Spanish	47	83.26	25.00	61.89	10.93	126.58	17.25	55.98	8.42	66.66	12.94
Combined Languages	204	84.29	20.57	62.48	10.17	134.16	16,30	57.77	8.45	64.80	13.14

* Difference significant beyond .05 level of confidence. [1]Includes two classes.

tests were given in French and German, respectively, while the forty-four unit quizzes in Spanish were regrouped into seven composite tests each comprising approximately three textbook lessons and one six-week period. The unit examinations, identical within each language, texted listening comprehension and reading ability in two modes of presentation: recognition of previously assimilated material, and simultaneous recall of vocabulary and basic sentence structure. Table 6 lists all corresponding reliability information.

Nine posttests, three in each language, were administered to all first-year students during the last two weeks of the spring term to obtain a measure of overall achievement in speaking, listening and reading ability. Table 7 summarizes the reliability coefficients reported in the Manual(s) for the standardized Pimsleur Language Proficiency Tests, Form A, (1967). Finally, Table 7 also lists corresponding coefficients of reliability computed for the change-in-interest and change-in-attitude variables.

All criterion measures were objectively scored with the exception of the speaking portions fo the Pimsleur tests which were subjectively scored in accordance with instructions set forth in the manuals. Estimates of inter-scorer reliability among the judges of the speaking tests showed a remarkable degree of agreement: French, .96 German, .85; Spanish, .95.

In all cases the behaviors evaluated were those fostered throughout the investigation. namely (1) the ability to speak basic sentences with acceptable pronunciation, (2) the ability to understand the spoken word, (3) the ability to read without translation, silently and aloud. While the ability to write (take dictation) was actively tagght, it was not evaluated except in informal classroom quizzes.

Student Attitude

The assessment of pre- and post-experimental student attitudes was

Table 6

The Unit and Composite Tests: Their Reliabilities as Obtained From the Present Sample

Language and Variable	Number of Items	N	$\bar{X}$	s	KR-20
French					
1. Unit Test 2	20	119	10.874	3.36	.655
2. Unit Test 4	20	120	9.408	4.13	.767
3. Unit Test 6_1	33	111	16.387	5.18	.756
4. Unit Test 7^1	15	105	7.615	3.01	.664
5. Unit Test 8^1	15	105	7.396	2.71	.598
German					
1. Unit Test 2	20	100	15.083	3.24	.767
2. Unit Test 4	20	97	15.056	2.83	.666
3. Unit Test 6_1	33	95	20.621	4.95	.758
4. Unit Test 7^1_1	15	91	9.210	3.57	.790
5. Unit Test 8_1	15	92	8.907	3.42	.759
6. Unit Test 9^1_1	15	84	9.335	2.33	.458
7. Unit Test 10	20	70	11.114	3.12	.598
Spanish					
1. Comptest11[2]	83	72	69.524	10.46	.939
2. Comptest 2	100	72	88.073	13.76	.946
3. Comptest 3	117	72	94.081	16.78	.962
4. Comptest 4	106	62	89.404	15.61	.970
5. Comptest 5	90	62	77.815	12.60	.967
6. Comptest 6	68	62	56.823	10.98	.961
7. Comptest 7	127	62	98.167	21.88	.975

[1] Listening Comprehension portion of Test only.

[1] Based upon the formula $\left(\frac{\sigma_t^2 - \Sigma pq}{\sigma_m^2 = \Sigma pq}\right)\left(\frac{\sigma_m^2}{\sigma_t^2}\right) = r_{tt}$

where $\sigma_m^2 = \Sigma R_i P_i - \bar{X}_t(1 + \bar{X}_t)$

[2] Comptest 1: Lessons 1-3
Comptest 2: Lessons 4-6
Comptest 3: Lessons 7-10A
Comptest 4: Lessons 10B-13
Comptest 5: Lessons 14-16
Comptest 6: Lessons 17-19
Comptest 7: Lessons 20-23

Table 7

The Posttests and Their Reliabilities: All Languages

Language	Name of Test	Grade	Coefficient (s)	Type
French	Listening	9, 10-12	.74, .73	Odd-Even corrected by Spearman-Brown
	Reading	9, 10-12	.84, .87	
	Speaking	9, 10-12	not reported	
	Interest I	Multilevel	.94	Odd-Even/Spearman Brown
	Change in Interest I	Multilevel	.83	Estimated by r_{x-y}
	Interest II	Multilevel	.89	Odd*Even/Spearman-Brown
	Change in Interest II	Multilevel	.57	Estimated by r_{x-y}
	Attitute	Multilevel	.93	Odd-Even/Spearman Brown
	Change in Attitude	Multilevel	.85	Estimated by r_{x-y}
German	Listening	9, 10-12	.76, .78	Odd-Even corrected by Spearman-Brown
	Reading	9, 10-12	.81, .87	
	Speaking	9, 10-12	not reported	
	Interest I	Multilevel	.90	Odd-Even/Spearman-Brown
	Change in Interest I	Multilevel	.64	Estimated by r_{x-y}
	Interest II	Multilevel	.75	Odd-Even/Spearman-Brown
	Change in Interest II	Multilevel	.59	Estimated by r_{x-y}
	Attitude	Multilevel	.88	Odd-Even/Spearman-Brown
	Change in Attitude	Multilevel	.77	Estimated by r_{x-y}
	Listening	9, 10-12	.73, .72	Odd-Even corrected by Spearman Brown
	Reading	9, 10-12	.87, .88	
	Speaking	9, 10-12	not reported	
	Interest I	Multilevel	.95	Odd-Even/Spearman-Brown
	Change In Interest I	Multilevel	.84	Estimated by r_{x-y}
	Interest II	Multilevel	.89	Odd-Even/Spearman-Brown
	Change in Interest II	Multilevel	.71	Estimated by r_{x-y}
	Attitude	Multilevel	.91	Odd-Even/Spearman-Brown
	Change in Attitude	Multilevel	.82	Estimated by r_{x-y}

$$r_{x-y} = \frac{r_{xx} + r_{yy} - 2r_{xy}}{2(1 - r_{xy})}$$

undertaken via the semantic differential. A sample of potentially relevant adjectives to be used as bipolar scales was chosen from among responses to an open-ended questionnaire administered in the pilot study (Smith and Littlefield, 1967, p. 65) in which students were asked to comment upon their relative likes and dislikes about the electro-mechanical equipment used in language learning. Additional adjectives were selected from among general descriptive literature and articles dealing with media, and from among representative words known to reflect an evaluative (attitudinal) function (Osgood 1958, pp.53-54). The specified adjectives were then paired with their opposite counterpart, e.g., good-bad, which were then located at either end of a seven-point continuum. Twenty-one bipolar adjective pairs were, thus, randomly listed about twenty-one seven-point continua. Finally, the concept "language practice tapes" was rated by all students (n=289) on each of the twenty-one pairs.

An "attitude-toward-media" score was derived through factor analysis. The principal-components solution with an orthogonal rotation of the original factor matrix (Harman, 1967) defined an evaluative function made up of twelve of the original twenty-one scales. The same procedure was used to determine a post-attitude score. Table 8 lists the pre- and post-factor analyses, with the respective coefficients ordered by magnitude (starred items indicated loadings greater than .30) while Figure 1 shows the average pre-post response per scale for all students irrespective of language or treatment condition. While slightly positive, the pretest profile would seem to indicate that the beginning language student largely had a wait-and-see attitude toward media for language learning.

Computational Procedures

Primary Objectives

The raw score and/or transformed data for the unit and posttests in each

Table 8

Significant Factor Loadings Ordered by Magnitude for the Concept Language Practice Tapes

Pretest (N = 289)

Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
*.88 Relaxed	.83 Simple	*.75 Pleasing	.90 Personal	.92 Busy
		*667 Valuable	.46	.34 Meaningful
		*.66 Interesting		
		*.65 Good		
		*.58 Rewarding		
		*.54 Helpful		
		*.54 Active		
		*.49 Meaningful		
		*.39 Definite		
		*.37 Powerful		

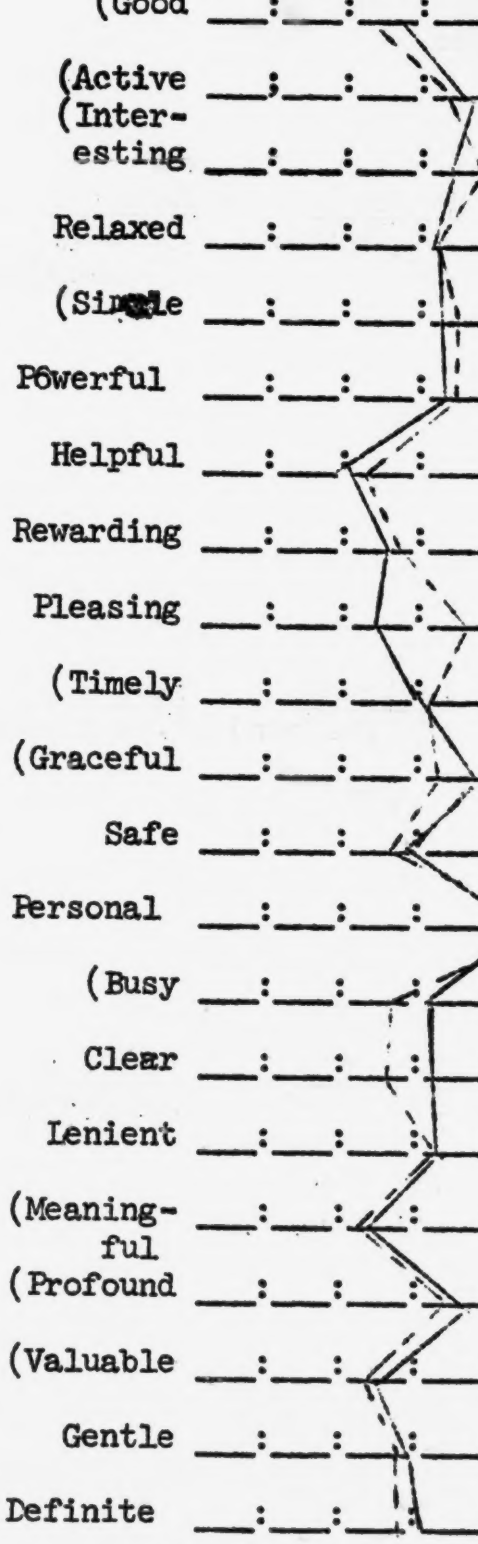
Factor 6	Factor 7	Factor 8	Factor 9	Factor 10
.69 Safe	.89 Graceful	.80 Gentle	.97 Profound	*.91 Timely
.54 Powerful	.33 Interesting	.73 Lenient		
.43 Rewarding	.31 Definite	.32 Definite		
.41 Meaningful		.30 Rewarding		

Posttest (N =218)

Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
*.84 Helpful	.85 Busy	.84 Simple	.77 Timely	.97 Personal
*.80 Meaningful	.51 Powerful	.64 Pleasing	.63 Graceful	
*.77 Valuable			.37 Clear	
*.73 Rewarding			.33 Pleasing	
*.64 Definite				
*.61 Good				
*.46 Pleasing				
*.42 Safe				
*.41 Clear				
*.37 Interesting				
*.36 Powerful				
*.30 Active				

Factor 6	Factor 7	Factor 8	Factor 9	Factor 10
.81 Interesting	.86 Lenient	.81 Safe	.86 Profound	.86 Relaxed
.67 Helpful	.50 Gentle	.34 Graceful	.41 Gentle	
.56 Active		.31 Gentle		
.48 Powerful				
.47 Good				
.36 Graceful				
.32 Rewarding				

*Scales taken as measuring an evaluative function.



		Pretest (N=289)		Posttest (N=218)		
		$\bar{X}$	s	$\bar{X}$	s	d
(Good	Bad)[1]	4.94	1.69	5.01	1.56	-.07
(Active	Passive)	4.27	1.53	4.25	1.50	-.02
(Inter-esting	Boring)	4.14	1.84	3.83	1.90	-.31
Relaxed	Tense	4.42	1.89	4.57	1.81	.15
(Simple	Complex)	4.34	1.72	4.26	1.47	.08
Powerful	Weak	4.25	1.50	4.32	1.68	-.07
Helpful	Unhelpful	5.58	1.62	5.31	1.68	-.27
Rewarding	Punishing	5.00	1.54	4.94	1.58	-.06
Pleasing	Annoying	5.05	1.71	3.86	1.74	-1.19
(Timely	Untimely)	4.56	1.61	4.53	1.58	-.03
(Graceful	Awkward)	3.96	1.60	4.21	1.51	-.25
Safe	Threaten-ing	4.91	1.59	4.97	1.56	-.06
Personal	Impersonal	3.23	1.82	2.94	1.78	-.19
(Busy	Resting)	4.48	1.75	4.59	1.76	.08
Clear	Hazy	4.33	1.94	4.64	1.80	.31
Lenient	Severe	4.26	1.44	4.39	1.41	.13
(Meaning-ful	Meaning-less)	5.06	1.78	5.06	1.67	.00
(Profound	Super-ficial)	4.23	1.57	4.13	1.32	-.10
(Valuable	Worthless)	5.02	1.71	5.18	1.68	.16
Gentle	Violent	4.45	1.49	4.65	1.30	.20
Definite	Uncertain	4.45	1.75	4.54	1.73	.09

[1]Scales enclosed in parentheses were originally presented with reversed polarity.

———— Pretest
---------- Posttest

Figure 1. Profile Ratings for Students on Concept Language Practice Tapes

language were subjected to double-classification analyses of variance and to single classification analyses of convariance with unequal n's in cells, according to procedures described by Winer (1962, pp. 229-44 and 578-94). All pretests related to assessment of the affective domain proved to have negligible relationships to achievement; hence, the interaction analyses planned for these variables were abandoned. Interaction analyses were continued, however, with respect to high-law aptitude and intelligence and the participation in one of the respective treatment groups. Figures 2 and 3 illustrate these arrangements.

Computational procedures for the analysis of all factorial data were based upon a least of squares solution with unequal n's in cells (Scheffe, 1960, section 4.4). A non-additive model was assumed. In the computation of main effects and interaction effects, each cell in the model was considered to contain the same number of observations as all other cells; thus, cell means were equally weighted in all computations.

Figure 4 illustrates the single classification analyses of covariance, the MLAT being the covariate in all cases. Computational procedures followed those described by Winer (1962, pp. 595-605 and 618-21).

All Major calculations were undertaken on the Purdue IBM 7090 and CDC 6500 computers. Sample solutions were checked by hand.

Secondary Objectives

Parametric and non-parametric procedures were used in the analysis of the data from the attitude and interest-motivation measures. The Sign Test (Siegel, 1959, pp. 68-75) was used to assess the relative directional orientation of the students's attitude toward language practice tapes. Simple t-tests within cells (repeated measures) were applied to the test on stability of attitude and interest

Factor A		Factor B: EC	LL-1	LL-2	Central
Higher-Aptitude Groups	French	13	10	11	8
	German	18	8	7	6
	Spanish	10	no group	3	10
Lower-Aptitude Groups	French	13	8	9	4
	German	17	11	3	11
	Spanish	9	no group	7	10

Figure 2. Schema for Aptitude by Equipment-Group Factorial Design Showing Cell Frequencies. (The aptitude by equipment-group analysis was carried out separately for each variable in each language.)

Factor A		Factor B: EC	LL-1	LL-2	Central
Higher-Intelligence Groups	French	15	9	11	7
	German	15	9	6	13
	Spanish	13	no group	4	10
Lower-Intelligence Groups	French	11	9	9	5
	German	20	11	4	4
	Spanish	5	no group	6	10

Figure 3. Schema for Intelligence by Equipment-Group Factorial Design Showing Cell Frequencies. (The Intelligence by equipment-group analysis was carried out separately for each variable in each language).

Equipment Groups

		EC	LL-1	LL-2	Control
Achievement in listening and reading comprehension, and speaking proficiency	French	26	18	20	12
	German	35	19	10	17
	Spanish	18	no group	10	19

Figure 4. Schema for Single-Factor Analyses of Covariance Showing Cell Frequencies. (The analyses of covariance was carried out separately for each variable in each language).

Equipment Groups

		EC	LL-1	LL-2	Control
Change in interest I and interest II, and in attitude toward language practice tapes	French	26	18	20	12
	German	35	19	10	17
	Spanish	18	no Group	10	19

Figure 5. Schema for Single-Factor Analyses of Variance Showing Cell Frequencies. (The Analysis of variance was carried out separately for each variable in each language).

motivation after ten months of instruction. Between-cell variation was assessed by single-classification analyses of variance (Figure 5) for non-repeated measures (Winer, 1962, pp. 39-43 and 52-62). In the latter case the unit of measurement was posttest minus pretest plus 100. Computational procedures for the teacher attitude anlaysis are discussed fully in the following section.

TEACHER ATTITUDE ANALYSIS

The Instructors

Four teachers participated in this study. Information relative to the characteristics of each is reported in Table 9. Two of the teachers had had previous experience with the instructional materials; two were new to the Marion School System. While one teacher in each language taught one class in each of the treatment conditions in French and Spanish, the respective level were assigned to two teachers in German, neither of whom taught under all four situations. Taken together, however, all four levels of the equipment groups were represented.

Individual differences among the teachers caused some variation in the presentation of the respective lessons. Within each language, however, differences were held to a minimum since all teachers closely coordinated their general approach to each unit. Two exceptions should be noted: First, a student teacher was assigned to one of the German instructors during the first six weeks of the fall term. Unskilled in classroom and laboratory techniques the student teacher tended to neglect periods of machine-guided practice. Secondly, the other German teacher was taken ill mid-way through the spring semester. His classes were taken over first by his colleagues and later by a substitute teacher, and some differences in procedure, preparation and personality were inevitable.

Restrictions inherent in the experimental design prevented a completel

Table 9

Description and Characteristics of the Teachers Involved in the Study

Language	Sex	Age	Years Teaching Experience	Degree(s)	Graduate Study
French	Female	22	1	Bachelor of Arts French, Ball State University (Indiana), 1967.	
German (Teacher I)	Male	25	4	Bachelor of Arts, English and German Ball State University 1964.	Master of Arts, German and English, Ball State University, 1966; NDEA Institute, 1967.
German (Teacher II)	Male	34	4	Bachelor of Arts, German, Purdue University, 1964.	NDEA Institute Dartmouth University (Russian) 1965.
Spanish	Feamale	24	4	Bachelor of Arts, English, Spanish, And Laitn, Moorehead University (Kentucky), 1964.	Master of Arts, Spanish and Latin, Ball State University, 1968.

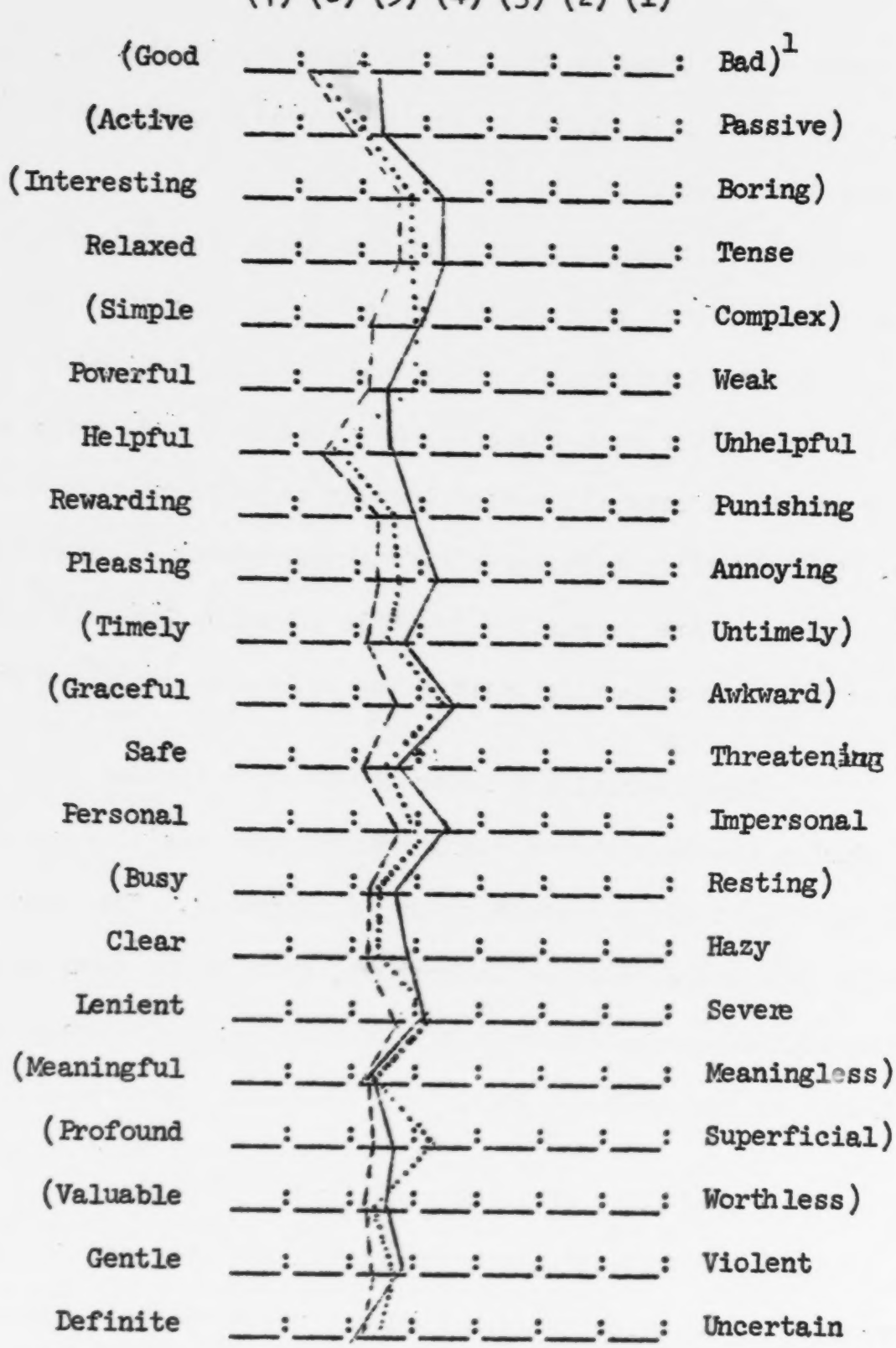
crossed design with respect to the instructor variable. Individual preference or special skill in manipulating one of the equipment configurations conceivably could have influenced the results of the experiment.

Two separate analyses were attempted to assess the degree of any unique instructor effects (1) a comparison of attitude toward media between the Marion Teachers and a reference group of similar characteristics and experience; (2) an evaluation of the stability-of-attitude toward media over the school year.

Teacher Expectancy

The semantic differential and factor analysis were used to obtain an estimation of instructor expectancy. The same twenty-one adjective pairs selected for the student survey of attitudes toward media (see page 24, above) were used as the bipolar saales in the teacher's version. Each teacher then rated the concepts "language laboratory", "electronic classroom," and "language practice tapes" on each of the twenty-one scales. Preference for either of the basic equipment groups was assessed by comparing the respective profiles of their rating using the Wilcoxson Matched-Pairs, Signed-Ranks Test (Siegel, 1956, pp. 75-83). A similar methodology was applied to assess the stability of attitude-toward-media over time.

A representative base against which to compare the Marion Teacher's attitude-toward-media was derived by extending the attitude-toward-media scale to nineteen additional first-year language teachers having experience in using both major types of language practice facilities under investigation. Figure 6 provides visual inspection of the relative direction and strength of the rating of all twenty-three teachers (4 Marion and 19 reference group). A mildly positive orientation towards media for language learning is evident.



[1]Scales enclosed in parantheses were originally presented with reversed polarity

_____ Language Laboratory

---------- Electronic Classroom

..... Language Practice Tapes

Figure 6 Profile Ratings for Teacher Reference Group on Concepts Electronic Classroom, Language Laboratory, and Language Practice Tapes. (N=23)

Language tapes were viewed as being good, helpful, meaningful, valuable and definite. The electronic classroom was preferred significantly (p. .01) over the language laboratory.

The intercorrelation matrices generated from the teacher's ratings of the respective concepts were then subjected to factor analysis. The principal components solutions and subsequent orthogonal rotation defined an evaluative (attitude) function for each concept. An attitude-toward-media score was then derived by summing across all scales loading significantly on the evaluative function. The significant factor coefficients ordered by magnitude for the respective analyses are summarized in Table 10 while Table 11 lists the differences in attitude-toward-media between the reference group and Marion Teachers.

Experimental and Reference Group Attitudes

The Marion teachers showed significantly more positive attitudes (p. .01) toward media than their reference group counterparts. The corresponding lower orientation toward the language laboratory, thus, would seem to make tenable a conclusion that some bias in favor of the electronic classroom was operating at the beginning of the academic year.

Stability of Teacher Attitudes Over Time

An evaluation of the differences between the pre- and post-profiles, averaged across all four teachers (see Figure 7 revealed that there was a tendency to value to electro-mechanical equipment less and less as the school year progressed. Truly significant differences may be masked by regression; however, on the average the post-profile ratings are significantly smaller (p .05, p .01) when the pre-post differences on the concepts "language laboratory" and "electronic classroom" are assessed by means of the Signed-Ranks methodology. While pre-experimental ratings on the concepts electronic classroom appear to have been inflated (due perhaps to knowledge of the results of the pilot study in which two of the

Table 10

Significant Factor Loadings Ordered by Magnitude for Concepts Rated by the Teacher Reference Group (N = 23)

Language Laboratory

Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
.91 Busy	*.86 Interesting	.82 Lenient	*.68 Safe	.80 Personal	.89 Powerful
	*.83 Definite	.74 Graceful	*.64 Gentle	.71 Relaxed	.74 Active
	*.82 Helpful	.70 Meaningful	*.55 Simple	.61 Simple	.72 Good
	*.81 Profound	.62 Rewarding			.51 Rewarding
	*.80 Valuable				
	*.60 Timely				
	*.53 Safe				

Electronic Classroom**

Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
.93 Timely	.86 Lenient	.90 Busy	.90 Personal	186 Simple	.87 Graceful
.66 Helpful	.66 Definite	.75 Active	.47 Clear	.56 Rewarding	.77 Relaxed
.62 Valuable	.57 Gentle	.67 Interesting	.47 Interesting	.55 Meaningful	.49 Gentle
.54 Good	.57 Safe	.62 Profound	.45 Pleasing	.49 Good	.49 Clear
.51 Meaningful	.43 Relaxed	.47 Meaningful	.42 Powerful	.48 Powerful	.45 Good
.46 Active	.43 Clear	.46 Valuable	.41 Definite	.46 Pleasing	.42 Pleasing
.44 Powerful	.42 Powerful	.40 Safe	.40 Profound	.44 Helpful	.39 Safe
.41 Rewarding	.39 Rewarding	.39 Powerful		.44 Safe	.30 Active
.35 Definite	.39 Profound	.31 Gentle		.42 Valuable	
.32 Interesting	.32 Pleasing			.39 Definite	
.32 Clear				.37 Clear	
				.37 Profound	
				.33 Graceful	

* Starred items taken as measuring an evaluative function.

** Evaluative score summed over all scales.

Table 11

Significant Factor Loadings Ordered by Magnitude for Concepts Rated by Teacher Reference Group (N 23)

Language Practice Tapes

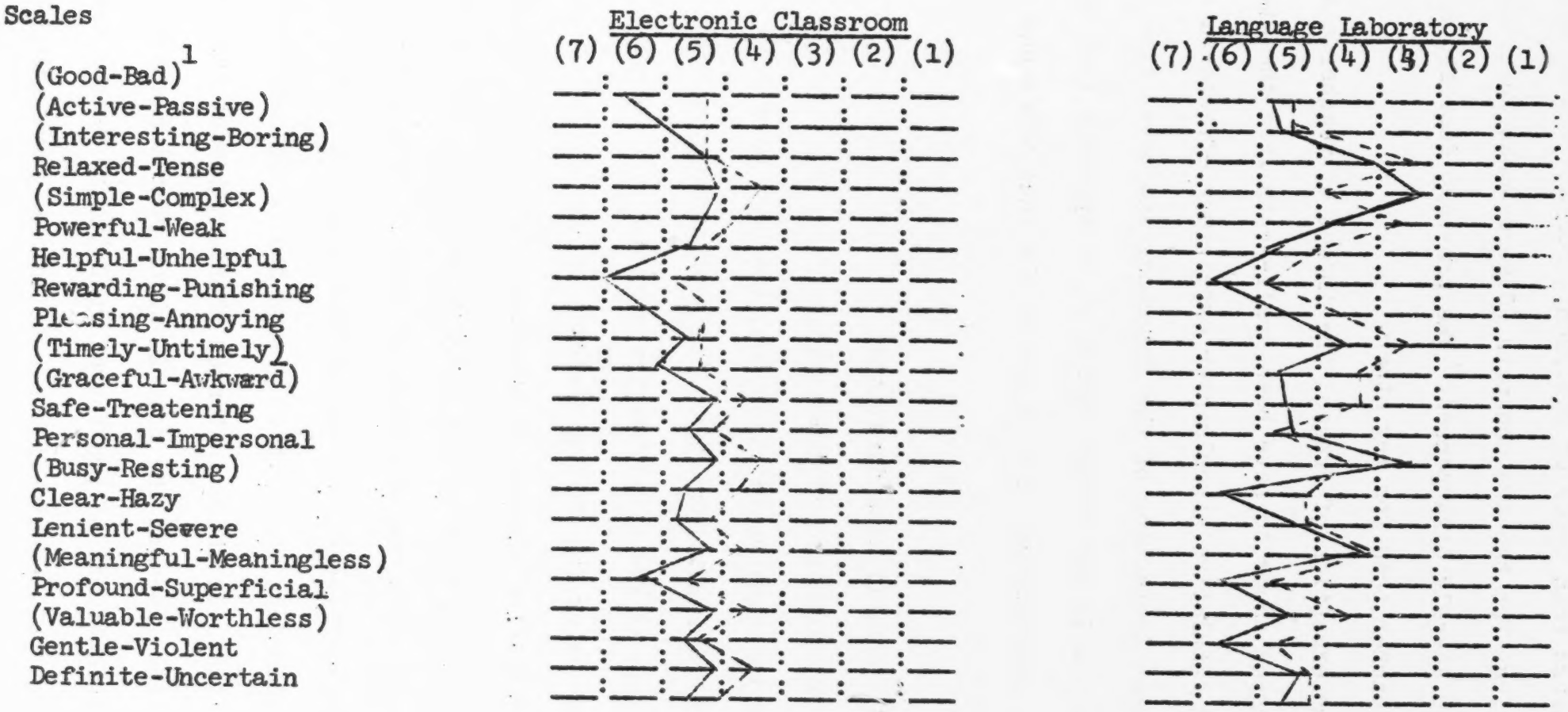
Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
*.87 Helpful	.86 Relaxed	.87 Busy	*.86 Timely	.90 Powerful	.79 Active
*.81 Good	.76 Simple	.75 Clear	*.43 Personal	.72 Graceful	.58 Profound
*.77 Meaningful	.74 Gentle	.74 Definite	*.40 Good	.63 Personal	-.48 Severe
*.74 Valuable	.54 Lenient	.64 Safe		.63 Interesting	.46 Valuable
*.54 Rewarding	.53 Safe	.41 Gentle		.56 Pleasing	
*.41 Interesting	.49 Pleasing			.40 Meaningful	
	.46 Graceful				

* Scales taken as measuring an evaluative function.

Table 12

Mean Attitude Scores for the Concepts Language Laboratory, Electronic Classroom, and Language Practice Tapes Compared between Teacher Reference Group and Marion Teachers

Concept Rated	Reference Group			Marion Teachers					
	N	X	s	N	X	s	DF	t	P
Language Laboratory	19	50.29	8.81	4	41.75	10.99	4	1.66	NS
Electronic Classroom	19	86.41	10.70	4	96.50	16.27	4	-5.29	.01
Language Practice Tapes	19	41.65	6.96	4	43.25	9.46	4	-.51	NS



[1] Scales enclosed in parentheses were originally presented with reversed polarity.

_____ pretest -------Posttest

Figure 7. Pre- and Post-profiles for Marion Teachers Rating Concepts Electronic Classroom and Language Laboratory. (N=4)

Teacher had participated). The two-semester period also apparently reduced the disparity in attitude toward both types of equipment, for an end-of semester analysis between the ratings for the two concpets (Signed-Ranks Test) indicated that the initial bias had largely disappeared. The pre-post decrease noted was greater for the French teacher than for any other.

In summary, with the exception of French, the impact of teacher attitudes on the experimental outcomes seems to have been small--both from the standpoint of pre-existing bias and cumulative experimenter expectancy effects--a conclusion further supported upon inspection of the frequency and total time the respective equipment was actually put to use, where it is apparent that the relationship between teacher attitude and actual use of the facilities was indeed small, (page 38, above).

Procedural Considerations

Distribution of Practice

Within groups using the electronic classroom, teachers were free to distribute practice with taped materials throughout the week and during the class period as they saw fit as long as the total use per week did not exceed seventy-five minutes. The groups using the record-playback or the broadcast laboratories were also permitted seventy-five minutes of practice time divided either in three twenty-five or two thirty-five minute modules each week, all of which followed a rigorous schedule. With the exception of Spanish, where the nature of the instructional materials required the use of 16mm sound films and an occasional use of the tape recorder, the control groups had no recourse to materials for machine-guided practice. In those instances where equipment was used, the teachers logged, daily, the time and the mode in which practice was distributed.

Despite periodic restatements of procedural guidelines, weekly use of the taped materials fell below the seventy-five minute maximum, averaging between

forty-five minutes per week. T

twenty-five and sixty-five minutes. Median use, irrespective of language, was forty-five minutes per week. The Spanish students, due to the use of films and tape-correlated filmstrips, received some twenty-five percent more machine-guided practice than either students of French or German. Within each six-week period considerable variation in the use of the equipment was evident, although generally speaking, the equipment enjoyed increased use as the academic year progressed. Table 13 summarizes the application of the equipment in minutes per six-week period.

It is interesting to note that, aontrary to expectationss the electronic classroom was used less than the langugge laboratory. No differences in the time the teachers used the equipment--assessed by the Kruskal-Wallis one-way analysis of variance (Siegel, 1956, pp. 184-93)--reached significance at the .05 level of cnnfidence. Finally, it is noteworthy that the record-playback equipment was applied between twenty and thirty percent of the total allotted period in the LL-2 groups.

The Learning Materials

The textbooks and corresponding tapes were commonly used, modern materials: The Audio-Lingual Materials (A-LM) Level One (1962) for French and German; for Spanish La familia Fernandez (EBF) Primer nivel (1963). Each text emphasizes the listening and speaking skills; reading and writing are developed only after the student has gained some experience in pronunciation and listening comprehension. Grammar is presented inductively. The only fundamental difference between the instructional materials is that those for Spanish include films and filmstrips in addition to the printed workbook exercises and correlated tape recordings.

The teacher's manuals which accompany the A-LM and EBF texts present a brief rational for the sequential nature of each presentation, a suggested lesson plan for each unit, and specific exercises for pronunciation, structural drill and dictation.

The Spanish materials require a staggered schedule so that up to four lessons

Table 13

Application of the Electronic Classroom and the Language Laboratory: Minutes Use Per Six Weeks

Six Week Period	French			German				Spanish	
	EC	LL-1	LL-2/RP[1]	EC-1	EC-2	LL-1	LL-2/RP[1]	EC	LL-2/RP[1]
1	100	150	150/30	280	150	165	195/75	247	326/115
2	175	200	200/55	323	130	100	155/65	281	241/90
3	300	300	300/100	245	265	225	250/30	237	291/91
4	300	300	300/95	235	300	320	385/70	352	361/97
5	225	250	250/95	055[2]	300	270	290/25	319	314/89
6	200	225	265/90	190	274	270	270/50	381	402/108
Totals	1300	1425	1465/465	1328	1415	1350	1545/315	1817	1937/600

Average Use By All Equipment Groups

French 1397 Minutes

German 1410 Minutes

Spanish 1877 Minutes

[1]Number of minutes of total record-playback facilities were used.

[2]Teacher resigned.

may be taught simultaneously, Thus, the teacher may present the imitation phase of one lesson, the grammar exercises of a second, the reconstruction of a dialog to a narrative in a third, and the listening comprehension exercises of a fourth. The materials in French and German also involve some overlap, but to a lesser degree. For all three languages, the correlated audio materials are designed to be used regularly and systematically, and are considered an integral part of each instructional unit.

Measurement and Evaluation of Achievement

Six-week unit examination and quizzes were uniformly administered via headsets in the electronic classroom and language laboratory groups since the listening comprehension portions of the tests were pretaped. The same tests were administered via a single tape machine and loudspeaker to the control groups. Make-up exams were routinely provided for absentees.

Unit tests were also supplemented by teacher-made quizzes which usually took the form of dictations or the completion of a sentence with the correct form of a word.

Composite grades were derived from each individual's six-week performance in classroom and laboratory. A final grade, in turn, was determined by a summation of all six-week grades and final examination scores.

RESULTS OF THE ANALYSIS OF THE DATA

Aptitude and Intelligence by Equipment Group Analysis

Generally speaking, in all languages the main effects for the higher aptitude and intelligence groups were significantly higher than for their lower group counterparts. For language aptitude, the date tend to support the hypothesis of no interaction between the effectiveness of the equipment groups and the student's general level of aptitude for learning a foreign language.

Significant interaction between the level of intelligence and equipment group appeared in French on three of the unit exams, thus, presenting some mod support for a conclusion that the higher-intelligence students may profit mor from practice in the record-playback language laboratory than students with s ilar intelligence who use the electronic classroom facilities.

The Effectiveness of the Equipment Group

French

Analyses of covariance indicated that the group using the record-playbac facilities achieved more than all of the other groups on seven of the eight criterion variables, and significantly so in five instances as can be seen in Table 14. In French, therefore, the hypotheses of no difference between grou in speaking and reading ability may be allowed to stand. The hypothesis of zr difference in listening comprehension is refuted by the data, in one case fav ing the electronic classroom over the control group, and in the others, favor students who used the record-playback language laboratory. Finally, the rank order achievement of the remaining groups is noteworthy: Generally speaking, students in LL-1 attained higher scores than those in the EC group on half of the variables. The EC group was better than all others on the global listeni test ($p.<.05$) but, on the whole, achieved somewhat less than the no-equipment group on the remaining criterion measures.

German

The results of the covariance analyses for German closely parralled the results for French. Separate analyses by instructor indicated that Teacher 1 obtained better results by following the discipline of regularly-scheduled pr tice periods. Under his supervision, the students in the record-playback grou achieved more than those studying with the aid of the broadcast laboratory or

Table 14

Results of the Covariance Analysis of the Equipment Group Effectiveness: French

Adjusted Means for Treatment Groups

Variable	(1) EC (N=26)	(2) LL-1 (N=18)	(3) LL-2 (N=20)	(4) Control (N=12)
1. Unit Test 2	9.65	10.22	12.05** (3,2)	11.17
2. Unit Test 4	8.39	9.59	10.68** (3,1)	8.91
3. Unit Test 6[1]	5.60	6.16	6.22** (3,1)	5.95
4. Unit Test 7	14.49	15.76	17.19** (3,1)	15.40
5. Unit Test 8	11.92	13.63	14.27	12.86
6. Listening[1]	9.10** (1,4)	8.48	8.57	8.39
7. Reading	10.39	10.72	12.47	11.54
8. Speaking	51.71	52.25	56.93* (3,4)	50.28

* Difference significant beyond .01 level of confidence.
** Difference significant beyond .05 level of confidence.
*** Difference significant beyond .01 level of confidence.

[1] Data transformed by $\sqrt{x} + \sqrt{x+1} \longrightarrow x$

electronic classroom on six of the ten criterion measures employed, (Table 15). The general higher achievement of the no-equipment students over those using the electronic classroom under Teacher II was apparently the result of an attitude or interest factor since Teacher II's control students indicated the least loss of interest in language learning and in addition showed a large gain in the attitude toward- media evaluation--the result, perhaps, of systematic use of tapes (contrary to experimental guidelines) during the last months of the spring semester by the substitute teacher. Thus, the conclusions relevant to the effectiveness of the equipment groups are based only upon an analysis of the data for Teacher I.

To summarize for German, the hypotheses of no difference between groups in listening comprehension and reading ability are rejected. Longer practice periods using lab equipment with record-playback capability generally produced higher achievement than massed practice without record-playback practice. To a lesser degree, distributed practice via the electronic classroom produced greater learning in the audio-lingual skills and reading ability where students received tape-guided practice in a broadcast language laboratory.

Spanish

Non-parametric analyses of the medians for Composite Tests I and II and analyses of covariance for the remaining criteria on measures indicated that all the equipment groups generally achieved more than their control counterpart on the interim and end-of-term examinations. Only one difference reached marginal significance, see Table 16, in favor of the electronic classroom. Thus, the hypotheses of no difference in the effectiveness of the equipment groups in listening comprehension, reading, and speaking ability are allowed to stand.

Table 17 summarizes all significant individual comparisons among the respective equipment groups. Three trends are apparent: (1) the equipment

Table 15

Results of the Covariance Analysis of the Equipment Group Effectiveness: German by Instructor

Adjusted Means for Treatment Groups

Variable	Teacher I (1) EC-1 (N=17)		Teacher I (2) LL-1 (N=19)		Teacher II (3) LL-2 (N=10)		Teacher II (4) EC-2 (N=18)	Teacher II (5) Control (N=17)	
1. Unit Test 2	16.09		15.99		15.82		12.14	15.73***	(5,4)
2. Unit Test 4	15.30		15.46		16.82*	(3,1)	14.61	14.12	
3. Unit Test 6	23.32*	(1,2)	20.29		23.33**	(3,2)	16.73	19.00**	(5,4)
4. Unit Test 7[1]	9.39**	(1,2)	7.62		9.48***	(3,2)	8.21	8.55	
5. Unit Test 8[1]	9.01**	(1,2)	7.82		9.21***	(3,2)	7.94	8.43	
6. Unit Test 9	16.42		16.68		16.80		-----	-----	
7. Unit Test 10	18.82		16.99		20.66**	(3,2)	-----	-----	
8. Listening[1]	8.92		8.54		8.94		7.84	8.23	
9. Reading	17.19		15.09		19.52**	(3,2)	13.08	14.76	
10. Speaking	68.40		62.85		69.31		55.43	55.45	

* Difference significant beyond .10 level of confidence.
** Difference significant beyond .05 level of confidence.
*** Difference significant beyond .01 level of confidence.

[1] Data transformed by $\sqrt{x} + \sqrt{x+1} \rightarrow x$

Table 16

Results of the Covariance Analysis of the Equipment-Group Effectiveness: Spanish

Adjusted Means for Treatment Groups

Variable	(1) EC (N=18)	(2) LL-2 (N=10)	(3) Control (N=19)
1. Composite Test 1[1]	74.50	68.50	64.00
2. Composite Test 2[1]	94.50	93.50	89.00
3. Composite Test 3	93.04	91.09	95.02
4. Composite Test 4	88.04	84.80	90.55
5. Composite Test 5	79.11	75.36	76.45
6. Composite Test 6[2]	15.11	15.17	15.03
7. Composite Test 7	98.53	102.89	94.53
8. Listening	17.63	16.49	17.41
9. Reading	9.64	8.12	8.70
10. Speaking	43.89* (1,3)	37.77	37.22

* Difference Significant beyond .10 level of confidence.
** Difference Significant beyond .05 level of confidence.
*** Difference Significant beyond .01 level of confidence.

[1] Measure of central tendency is the median

[2] Data transformed by $\sqrt{x} + \sqrt{x+1} \longrightarrow x$

Table 17

Summary of Significant Individual Comparisons Among Equipment Groups

Language and Variable	From Analyses of Convariance	From Analyses of Variance By Aptitude	From Analyses of Variance By Intelligence
French			
1. Unit Test 2	LL-2 > EC (.05)		LL-2 > EC (.05)* LL-2 > Control (.05)*
2. Unit Test 4	LL-2 > EC (.01)	LL-2 > EC (.01)* LL-1 > EC (.05)*	LL-2 > EC (.01)**
3. Unit Test 6[1]	LL-2 > EC (.05)		
4. Unit Test 7	LL-2 > EC (.05)		
5. Unit Test 8		LL-2 > EC (.05)*	
6. Listening[1]	EC > Control (.05)		
8. Speaking	LL-2 > Control (.10)		
German (Includes data from Teacher I and Teacher II)			
1. Unit Test 2	LL-1 > EC (.10)		
2. Unit Test 4	LL-2 > Control (.10)		
3. Unit Test 6	LL-2 > Control (.10)		
4. Unit Test 7[1]	LL-2 > LL-1 (.01) EC > LL-1 (.05)		
5. Unit Test 8[1]	LL-2 > LL-1 (.01) EC > LL-1 (.05)		
7. Unit Test 10[2]	LL-2 > LL-1 (.05)		
9. Reading	LL-2 > Control (.05)		
10. Speaking	LL-2 > Control (.01)		
Spanish			
5. Composite Test 5			EC > Control (.05)**
10. Speaking	EC > Control (.10)		

*Difference significant among higher-group means.

**Differenc significant among lower-group means.

[1] Data transformed by square roots.

[2] Exludes data from teacher two.

groups generally achieved more than their control counterparts; (2) among the equipment groups, the record-playback lab groups, by-and-large, achieved significantly better than the broadcast laboratory groups; (3) the electronic classroom groups usually achieved more than the no-record groups, but less than the record-playback groups. The consumer of this research is cautioned against unwarranted generalization of these results to non-similar populations since within each groups the results are confounded by an uncontrolled instructor variable.

Interest-Motivation and Attitude Analysis

All students (N=244) tend to lose significantly in interest-motivation over the ten-month duration of the investigation. A by-language analysis yielded similar results irrespective of treatment group: French (p. .01), Spanish and German (p. .05). Only in French was there a decrement in interest between groups: The electronic classroom group losing more interest-motivation than all others (p. .01). Yet analyses of variance for the change-in-interest scores proved non-significant. Thus, it seems safe to conclude, that aside from some reduction in overall interest, there is no evidence for rejecting the hypothesis of no difference among the equipment groups in maintaining interest-motivation.

Minor effects of regression were also noted in the students' attitude-toward media scores. However, when viewed separately by language, the students in Spanish and German gained slightly, but non-significantly, in their evaluation of language practice tapes. Analyses of the change-in-attitude scores failed to reveal any significant differences or trends among the treatment groups within a given language. Thus, the hypothesis that student attitudes toward language tapes would remain stable throughout the year is supported by the experimental data. Table 18 summarizes the respective data for the change-in-interest and change-in-attitude analyses.

Table 18

Results of the Analyses of Variance on the Scores for Change in InterestII, Change in Interest II and Change in Attitude

French	EC (N=26)	LL-1 (N=18)	LL-2 (N=20)	Control (N=12)
Change in Interest I	84.27	83.44	88.95	91.00
Change in Interest II	86.85	93.93	94.15	96.25
Change in Attitude	90.00	97.78	98.20	102.75

German	EC-1 (N=18)	EC-2 (N=17)	LL-1 (N=19)	LL-2 (N=10)	Control (N=17)
Change in Interest I	82.78	93.41	88.11	95.48	98.41
Change in Interest II	95.92	93.74	98.63	99.85	100.26
Change in Attitude	97.50	96.18	103.32	100.00	107.27

Spanish	EC (N=18)	LL-2 (N=10)	Control (N=19)
Change in Interest I	88.78	97.30	89.47
Change in Interest II	94.72	101.70	94.63
Change in Attitude	101.78	107.80	104.05

No difference reached significance at the .05 level of confidence.

DISCUSSION

The only outcome which was consonant with the predicted absence of differences in the effectiveness of the equipment groups is related to the development of speaking ability. However, the results indicate that machine-guided practice uniformly had favorable effects on the development of listening comprehension, and to a lesser degree, reading ability. Excluding the data from German Teacher II, in no case did the control groups make statistically greater gains than any of the equipment groups (although occasionally, the control groups achieved more than their equipment counterparts).

Among the equipment groups, the largest gains were made by those using record playback facilities; second greatest gains were made by the groups experiencing listen-respond practice on a more distributed basis on the electronic classroom; the groups receiving listen-respond practice in a broadcast language laboratory ranked third overall. Thus, students who received practice which was massed primarily in half-hour modules twice weekly tended to outperform all others in listening and reading when part of the practice period was spent in contrasting utterances recorded for comparison. Finally, the experimental evidence lends strength to the conclusion that ease of access to the taped materials did not completely counter-balance the absence of record-playback facilities in the development of listening comprehension, and, secondarily, reading ability.

An explanation for these results can best be found in the variation in the application of the facilities. There is evidence that the French and German teachers were unsystematic in their use of the electronic classroom and the language laboratory at the beginning of the fall term--a critical period for developing the student's auditory memory, sign-symbol association, physical co-ordination and muscular control over speech. Conversely, the accumulation of audio-lingual practice over the year appears to have had some leveling effect on achievement and thus, perhaps, helps to account for the inisgnificant differences among the

equipment groups while contributing to the various significant differences over their control counterparts.

The almost complete lack of differences in Spanish may have been due to the cumulative effects of frequent exposure to the taped, film and filmstrip material which formed the core and dictated the sequence of each lesson for all treatment groups.

Aside from the obvious contribution of the cumulated time factor (the record-playback groups in all languages had the most total time) the length of the daily or weekly practice session seems critical. The teachers were apparently able to make more efficient use of longer periods of machine-guided practice since it was possible to integrate several activities and to respond to more individual differences than could be efficiently handled in shorter but more frequent practice sessions. The longer sessions also apparently increased the students' concentration and thus their ability to learn vocabulary and sentence structure.

Finally, the relatively disappointing results of the electronic classroom may have been caused by improvization by the teacher. In short, the lab sessions were relatively fool-proof and teacher-proof, while some improvization with the scope and sequencing of the exercises in the electronic classroom may have fragmented and dissipated learning.

Plausible explanations for the results obtained from the student interest and attitude analyses seem rather straightforward. Slightly positive interest and attitude expressed initially, probably reflected, simply, the novelty associated with learning a new language. Parental pressures and college entrance requirements undoubtedly played some role, but, an intrinsic interest in language <u>per se</u> appeared to be lacking. Nor was interest inhanced extrinsically, for although posttest interest scores showed low but positive correlation of increasing magnitude with the interim criterion measures (giving some evidence

that the student's interest-motivation and attitude were affected by his relative achievement among his peers), the feedback from six-week grades and examinations was apparently not strong enough to maintain or increase his initial interest, except in a few cases. Thus the results seem congruent with Lambert's conclusion (1963) that achievement in a foreign language is not a central goal for the secondary-school student; rather it is incidental to the more challenging goal of trying to find and to establish a chosen profession (p. 118).

The decrease in attitude orientation among the equipment groups may have relfected some disappointment that the use of taped materials did not live up to expectations. That is, some students may have hoped, initially, that taped-guided practice would allow them to achieve a practical mastery in a much shorter time and with considerable less effort than was actually possible.

Finally, the results of the teacher attitude-toward-media anlayses tend to ameliorate somewhat the uncontrolled instructor effect in this investigation. Although the teachers indicated a greater preference toward the electronic classroom, it was used least of all among the equipment groups and fewer significant differences were found in its favor. Conversely, the language laboratory was used more in spite of the teachers' preference to the contrary. Thus, there seems to be no evidence that the teachers' bias influenced the students' performance. An explanation for this apparent anomaly, perhaps, can be found in the discipline that both students and instructors derived from regularly-scheduled sessions, in comparison with random practice in the electronic classroom. In this respect, dependence upon the teacher's "optimal" distribution of taped practice may have nullified any helpful effects of the practice exercises materials in the electronic classroom. Too convenient access to the materials and equipment may have obviated, in the teacher's mind, the need for regularly planned and logically sequenced practice.

CONCLUSIONS AND RECOMMENDATIONS

If the shorter practice sessions were detrimental to the effectiveness of the electronic classroom and if the exclusion of record-playback facilities was detrimental to the effectiveness of the language laboratories, the following modifications might improve their application: First, the teachers in a language department already possessing or contemplating the acquisition of an electronic classroom might be well advised to use the facilities in practice periods of no less than fifteen-minutes duration; moreover, the equipment should probably be used once, rather than several times during the same hour, in order to allow the students to achieve a meaningful degree of concentration. Second, the language department contemplating the purchase or the expansion of a language laboratory might be well advised to plan, for first-year students, at least two half-period or one full-period practice session in the laboratory each week. The students, in turn, should profit more from their total experience if the basic installation includes at least partial facilities for recording and playing back under teacher supervision.

Finally, the best of all equipment installations might prove to be a judicious combination of both electronic classroom and language laboratories. A practical goal for a basic installation, then, might be one electronic classroom for every two language teachers and one record-playback laboratory large enough to accommodate the largest language class. What is proposed, however, would involve more than mere possession of the accoutrement. Four additional elements would be needed: (1) a curriculum library of taped materials of varying scope and difficulty; (2) an openness and planning which permits voluntary and independent use of the language laboratory during study-halls or before or after school, much as a library routinely provides open-shelf service and study space for its clientale; (3) the use of paraprofessionals to monitor the lab and to act as tape librarians, and (4) the systematic monitoring and evaluation of

speaking ability (repetition and transformation) via the monitor-intercommun cation network using a method equal or similar to the one recommended by Sta (1966, Chapter 7). In short, a "library" laboratory system is advocated whe by taped material and correlated visuals are constantly available to all lan age students. Such an applicatinn would allow the language laboratory to be come truly an instrument of practice, and its analogue the electronic classr could be usedmmore efficiently to extend class practice while at the same ti providing the teacher with a means to evaluate daily (via the console interc facilities) both listening comprehension and speech production. Systematic ratings of this nature would then provide some concrete evidence of achievem in the audio-lingual skills and should make corresponding six-week or semest grades more valid estimates of true achievment.

The suggested combination of electronic classroom and language laborato should so prove to be a sounder investment in the long run since the electro classroom is less complex and less costly to maintain than the language labo tory, both from the standpoint of expense, space, and time. A comparative c analysis, including installation and maintenance, will be the subject of ano report.

In conclusion, this investigation has further confirmed that the langua laboratory and the "chandelier-type" electronic classroom both had favorable effects upon students' achievement in learning a second language at the seco dary-school level; although the trend in achievement showed the equipment gr to gain more than their control counterparts, the lack of greater statistica significance over the control groups is somewhat pertrubing and an indicatio that more insights into techniques of language laboratory application are so needed at the first-year level.

Further research might profitably evaluate the combined use of the electronic classroom and the language laboratory. Another subject might be the proper sequencing of taped exercises as one element of audio-visual-lingual materials. A third subject might be the value of "library" or voluntary study with recorded materials.

Finally, it is siggificant that with few exceptions, those texts devoted to the "whats and wherefores" about labs have chosen to not suggest techniques for the use of the electronic classroom and the language laboratory. Instead, authoritative statements have been written on types of equipment on specifications, and on the need for maintenance. Publications by state foreign language consultants are equally at fault since their descriptions of laboratory techniques usually have been designed to inform the naive administrator rather than aid the practitioner. Indeed, "it is now time that we raise our sights, that we place the machine and the routine in their proper perspective, and that we give the bulk of our attention to what is--or what should be--taking place in our laboratories: Learning" (Valette, 1968). The challenge is clear.

BIBLIOGRAPHY

Barrutia, R. "The Past, Present, and Future of Language Laboratories." Hispania 56:888-99; 1967.

Bauer, E.W. "A Study of the Effectiveness of Two Language Laboratory Conditions on the Teaching of Second-Year German." International Review of Applied Linguistics 2:99-112; 1964.

Birkmaier, E.M. and Lange, D.L. "Foreign Language Instruction." Review of Educational Research 37:186-99; 1967.

Carroll, J.B. and Sapon, S.M. Manual for the Modern Language Aptitude Test. New York: The Psychological Corporation, 1959.

Carroll, J.B. and Sapon, S.M. The Modern Language Aptitude Test, Form A. New York: The Psychological Corporation, 1959.

Carroll, J.B. "Research on Teaching Foreign Languages." Handbook of Research on Teaching. N.L. Gage (ed.) New York: Rand McNally Co., 1963, Chapter 21.

Carroll, J.B. "Research on Foreign Language Teaching: The Last Five Years." Reports of the Working Committees: Northeast Conference on the Teaching of Foreign Languages. R.G. Mead, Jr., Ed. Mensha, Wisconsin: The George Banta Co., Inc., 1966, pp. 13-42.

Cook, H.R. The Effects on Learning of Structural Drills in Spanish Broadcast via High Frequency AM Radio (Final Report). Bloomington: The Indiana University Foundation (NDEA Title III), 1964, 24 pages.

Crossman, D.M. The Electronic Classroom: A Guide for Planning. Albany: University of the State of New York, State Education Department, 1964.

Edgerton, M.F. (Chairman). "Liberated Expression." Reports of the Working Committees: Northeast Conference on the Teaching of Foreign Languages. T.E. Bird, Ed. Mensha, Wisconsin: The George Banta Company, Inc., 1968 pp. 76 - 115.

Gamba, T., and Smith, W.F. The Role of Interest, Attitude, and Motivation in Second Language Learning and the Use of the Language Laboratory. Unpublished paper, 1966. (Available from the authors).

Harman, H.H. Modern Factor Analysis. Chicago: University of Chicago Press, 1967 (Second Edition), Chapters 8 and 14.

Henmon, V.A.C. and Nelson, M.J. Examiner's Manual for the Hermon-Nelson Tests of Mental Ability for Grades 6 - 9. (Revised by T.A. Lamke and M.J. Welson) New York: Houghton Mifflin Co., 1957, 27 pages.

Hocking, E. "Language Laboratory Experimentation." International Journal of American Linguistics 32:80-91; 1962.

Hutchinson, J.C. The Language Laboratory, How Effective Is It? Washington, D.C.: U.S. Office of Education, 1964.

Hutchinson, J.C. "The Language Laboratory: Equipment and Utilization." In Trends in Language Teaching, A. Valdman, Ed. New York: McGraw-Hill Book Co., 1966, Chapter 12.

Keating, R.F. A Study of the Effectiveness of Language Laboratories: A Preliminary Evaluation in Twenty-one School Systems of the Metropolitan School Study Council, New York: Institute of Administrative Research, Teachers' College, Columbia University, 1963.

Lambert, W.E., Gardner, R.C., Olton, R., and Tunstall, K. A Study of the Roles of Attitude and Motivation in Second Language Learning (Final Technical Report). Montreal: McGill University (NDEA Title VII), 1961.

Lambert W.E. "Psychological Approaches to the Study of Language, Part II: On Second Language Learning and Bilingualism." Modern Language Journal 47:114-21; 1963.

Lorge, S.W. "Language Laboratory Research Studies in New York High Schools: A Discussion of the Program and Findings." Modern Language Journal 48:409-19; 1964

Mallery, D. The New Dimension in Foreign Language Teaching. Boston: The National Council of Independent Schools Bulletin, 1961.

Mathieu, G. "Language Laboratories." Review of Educational Research. 32:168-76; 1962.

Mueller, K.A. and Wiersma, W. "The Effects of Language Laboratory Types Upon Foreign Language Achievement Scores." Modern Language Jounral 51:349-51; 1967.

Neidt, C.C. and Hedlund, D.E. "Students Reaction to High School Language Laboratory Activities." Modern Language Journal 49:470-75; 1965.

Osgood, C.E., Suci, G.J., and Tannenbaum, P.H. The Measurement of Meaning. Chicago: The University of Illinois Press, 1957.

Pimsleur, P., Sundland, D.M., and McIntire, R.D. Under-Achievement in Program Language Learning (Final Report). Columbia: The Ohio State University Research Foundation (NDEA Title VII), 1963.

Pimsleur, P. Masberg, L, and Morrison, A.V. "Student Factes in Foreign Language Learning: Review of the Literature." Modern Language Journal 46:160-70; 1962.

Pimsleur, P. Pimsleur Language Proficiency Tests (French, German, Spanish) Form A, New York: Harcourt, Brace and World, Inc., 1967.

Pimsleur, P. Manual for the Pimsleur Language Proficiency Tests. New York: Harcourt, Brace and World, Inc., 1967.

Regenstreif, H. "The Language Laboratory vs. the ElectronicCClassroom." National Association of Language Laboratories Directors Newsletter. 2:14-17; 1968.

Rivers, W.M. The Psychologist and the Foreign Language Teacher. Chicago: The University of Illinois Press, 1964.

Sawyer, J.O. "Foreign Language Instruction." Review of Educational Research 34:203-10; 1964.

Siegel, S. Non-Paramteric Statistics for the Behavioral Sciences. New York: McGraw Hill Book Co., 1956.

Smith, P.D. Teaching a Modern Language via Telephone. (Unpublished Ph.D. Dissertation) The Ohio State University, 1967.

Smith, P.D. and Berger, M. An Assessment of Three Foreign Language Teaching Strategies Utilizing Three Language Laboratory Systems. Washington, D.C.: USOE, Project No. 5-0683, (Final Report), 1968.

Smith, W.F. and Littlefield, R.L. The Language Laboratory and the Electronic Classroom: A Comparison. A Report to the Indiana Language Program for Research during 1966-67. (Available from the Indiana Language Program).

Tanzman, J. "Three Ways to Make Your AV Know-How Count." Audio Visual Instructio 11:797-99; 1966.

White, W.H. A Comparison of Two Methods of Teaching Beginning Spanish in Junior High School. (Unpublished Ph.D. Dissertation) The University of Arkansas, 1963.

Winer, B.J. Statistical Principles in Experimental Design. New York: McGraw-Hill Book Co., 1962.

Instructional Materials:

A-LM French, Level I. New York: Harcourt, Brace and World, Inc., 1962.

A-LM German, Level I. New York: Harcourt, Brace and World, Inc., 1962.

A-LM Teacher's Manual, Level I (French and German), New York: Harcourt, Brace and World, Inc., 1961.

La familia Fernandez. Wilmette: Encyclopedia Britannica Films, Inc., 1963.

Also Noted.

Cole, R.L. "Foreign Languages in the Residence Hall" Modern Language Journal 49:362-63; 1965.

Johnson, M.R. "Tape Recorder vs Non-Record Laboratory." French Review 39:899-905; 1966.

Stack, E.M. Language Laboratory and Modern Language Teaching. New York: Oxford Press, 1966.

Valette, R.M. "The Use of the Language Laboratory in Intermediate and Advanced Classes." National Association of Language Laboratory Directors' Newsletter 2(3): 4-9; 1968.

APPENDIX B

Interest Test II

Directions: Read each of the following items and rate the degree of likelihood of your making each statement. All of your ratings should be recorded on your answer card, not on this sheet. Be sure to read each item with care. Begin responding with item number 1.

1. I like to use the foreign language I'm learning in conversation with friends.

(1) a	(2) b	(3) c	(4) d	(5) e
Not at ALL	Not Much	Somewhat	Quite a Bit	A Great Deal

2. Attending a foreign film showing can help your classwork in foreign languages.

(1) a	(2) b	(3) c	(4) d	(5) e
Not at All	Not Much	Somewhat	Quite a Bit	A Great Deal

3. I like to eat in a restaurant where German French dishes are served.

(1) a	(2) b	(3) c Spanish	(4) d	(5) e
Not at All	Not Much	Somewhat	Quite a Bit	A Great Deal

4. I pay more attention to foreign news in the newspapers and on TV since I began studying foreign Languages.

(1) a	(2) b	(3) e	(4) d	(5) e

5. I would like to have some opportunity during the summer to practice my foreign language.

(1) a	(2) b	(3) c	(4) d	(5) e
Not at all	Not Much	Somewhat	Quite a Bit	A Great Deal

6. I am working toward a good reading ability in German French Spanish because I will need it for my major field.

(1) a	(2) B	(3) c	(4) d	(5) e
Not at all	Not Much	Somewhat	Quite a Bit	A Great Deal

7. Language practice in the language laboratory helps me to do better on quizzes and tests.

(1) a	(2) b	(3) e	(4) d	(5) e
Not at all	Not much	Somewhat	Quite a Bit	A Great Deal

8. I like to say the words and expressions I've learned in my German French Spanish course silently to myself even when I'm not doing a specific assignment.

(1) a	(2) b	(3) c	(4) d	(5) e
Not at All	Not much	Somewhat	Quite a bit	A Great Deal

9. I would like to keep my French / German / Spanish textbooks so that I can use them for reference later.

(1) a	(2) b	(3) c	(4) d	(5) e
Not at All	Not Much	Somewhat	Quite a Bit	A Great Deal

10. I like to do my French / Gemman / Spanish homework as soon as possible after class to get it out of the way while things are still in my mind.

(1) a	(2) b	(3) c	(4) d	(5) e
Not at All	Not Much	Somewhat	Quite a Bit	A Great Deal

11. I like to leave my French / German / Spanish homework till just before class so that it will be fresh should there be a quiz.

(1) a	(2) b	(3) c	(4) d	(5) e
Not at All	Not Much	Somewhat	Quite a Bit	A Great Deal

12. Given the possibility to haveing a French - / German - / Spanish - speaking roomate next year, I would give the matter serious consideration.

(1) a	(2) b	(3) c	(4) d	(5) e
Not at All	Not Much	Somewhat	Quite a Bit	A Great Deal

13. I feel I do my most effective studying in French / German / Spanish during the week of a unit test.

(1) a	(2) b	(3) c	(4) d	(5) e
Not at All	Not Much	Somewhat	Quite a Bit	A Great Deal

14. Generally I enjoy my French / German / Spanish course as much as others.

(1) a	(2) b	(3) c	(4) d	(5) e
Not at All	Not Much	Somewhat	Quite a Bit	A Great Deal

15. If it were possible to have a "French / "German / "Spanish table" in the cafeteria I would try it out and possibly eat there regularly.

(1) a	(2) b	(3) c	(4) d	(5) e
Not at All	Not Much	Somewhat	Quite a Bit	A Great Deal

16. I like to look at the articles and items on the language bulletin borad and try to understand them.

(1) a	(2) b	(3) c	(4) d	(5) e
Not at All	Not Much	Somewhat	Quite a Bit	A Great Deal

17. The amount of time and effort I put into my French / German / Spanish course is determined exclusively by grade considerations.

(1) a	(2) b	(3) c	(4) d	(5) e
Not At All	Not Much	Somewhat	Quite a Bit	A Great Deal

APPENDIX C

Attitude Orientation

On the following page you will be asked to describe your feelings toward an idea or concept related to language learning and langugge teaching. You will be asked to rate your feelings, your reactions to this idea by placing a check-mark along a line bounded by two adjectives.

Four example, you might react to the word Mouse in the following manner.

MOUSE

Heavy	:__:__:__:__:__:__:✓:	Light
White	✓:__:__:__:__:__:__	Black
Strong	__:__:__:__:__:✓:__	Weak

Check only one space per line. Give your first impressions but do not be careless. It is your true feelings, your true impressions that are of interest. Work quickly. Please do not change any of your responses. The results of these ratings will have absolutely no bearing upon your grade in this class.

Name_____Language_____Date_____

LANGUAGE PRACTICE TAPES

Bad	___:___:___:___:___:___:___	Good	(7)*
Passive	___:___:___:___:___:___:___	Active	(7)
Boring	___:___:___:___:___:___:___	Interesting	(7)
Relaxed	___:___:___:___:___:___:___	Tense	(1)
Complex	___:___:___:___:___:___:___	Simple	(7)
Weak	___:___:___:___:___:___:___	Powerful	(7)
Helpful	___:___:___:___:___:___:___	Unhelfpul	(1)
Rewarding	___:___:___:___:___:___:___	Punishing	(1)
Pleasing	___:___:___:___:___:___:___	Annoying	(1)
Untimely	___:___:___:___:___:___:___	Timely	(7)
Awkward	___:___:___:___:___:___:___	Graceful	(7)
Safe	___:___:___:___:___:___:___	Threatening	(1)
Personal	___:___:___:___:___:___:___	Impersonal	(1)
Resting	___:___:___:___:___:___:___	Busy	(1)
Clear	___:___:___:___:___:___:___	Hazy	(1)
Lenient	___:___:___:___:___:___:___	Severe	(1)
Meaningless	___:___:___:___:___:___:___	Meaningful	(7)
Superficial	___:___:___:___:___:___:___	Profound	(7)
Wortheless	___:___:___:___:___:___:___	Valuable	(7)
Gentle	___:___:___:___:___:___:___	Violent	(1)
Definite	___:___:___:___:___:___:___	Uncertain	(1)

*Polarity of the scale